

# GOVERNMENT OF THE PROVINCE OF ALBERTA

## DEPARTMENT OF AGRICULTURE

The plans appearing on this sheet are of ventilation systems which have been installed at various Provincial Institutions by the Buildings Branch of the Department of Public Works. These systems have proven quite satisfactory and have been responsible for improving the health of the live stock housed in the barns.

This system, which is based on the "King system", has been installed in horse, cattle and hog barns, as well as in chicken houses and root cellars. The foul air, being heavy, falls to the floor where it is drawn off by one or more flues at the floor level (Fig. F). The fresh air is drawn in through a number of small ducts on the outside walls (Fig. C). The amount of air removed from the barn is regulated by a control slide and a heat door is provided at the ceiling to remove warm air in summer. The foul air flues are constructed of double boards with paper between to keep them air-tight and warm.

The size of the foul air flue may be calculated from the following table prepared at MacDonald College, McGill University.

Height in feet from floor to ridge of roof	20	25	30	35	40	45	50
No. of Cows or Animal Units in Barn:	(Flue area needed, Square Inches)						
10	430	362	318	287	264	246	230
11	474	396	350	316	291	270	253
12	518	435	382	345	317	294	276
13	560	468	414	373	343	320	300
14	604	507	445	403	370	344	323
15	646	540	477	430	396	369	346
16	690	580	510	460	424	394	369
17	731	613	541	488	450	418	392
18	776	654	573	518	476	443	416
19	818	685	605	545	502	467	438
20	864	726	637	575	529	492	461
21	905	756	668	603	555	517	474
22	954	800	698	630	579	545	511
23	990	829	732	660	608	566	530
24	1039	870	766	690	639	587	554
25	1078	900	796	718	660	615	575
26	1122	945	826	749	698	639	604
27	1160	974	860	775	714	665	621
28	1210	1020	894	810	740	689	647
29	1250	1042	922	832	766	714	668
30	1292	1090	961	860	792	741	690

**NOTE:** An Animal Unit is taken to be a mature cow. Young animals and calves are "lumped" in groups of 1,000 pounds to make one animal unit.

If a flue larger than 3 or 4 feet square is required, it is best to construct 2 smaller flues.

For the average size hog barn, with about ten pens, two flues each, 20 inches to 24 inches square, placed near the manure alleys so that the odour does not travel over the feeding troughs are required. Figure "A" shows a cattle barn with flues on the outside walls when alleys are near the outside walls. Figure "B" shows position of flues when alley is in the centre of the barn. Figure "E" shows a hog barn with foul air flues at the alleys. Flues on the outside wall are generally not as good as those near the centre, but if care is taken to insulate them they will work satisfactorily.

The Ventilator on the roof, shown in Figure "D", should be open on all sides, each opening at least the size of the flue. When two flues lead to one Ventilator, the size of each opening should be equal to the total area of the two flues. A large overhang at the eaves will help to keep out the rain and snow. A screen is placed in the Ventilator to keep the Vent shaft clean. This should be removed during the cold months to prevent the moist air from freezing on the screen and stopping the circulation.

Louvres or baffles were found to be unsuccessful because of the moist air freezing on them and closing up the openings.

The total area of the fresh air intakes is usually made about 80% of the total area of the foul air flues. The fresh air is brought in through ducts run between the studding as shown in Figure "C". The outside openings should be screened and at window sill height; the inside openings should be near the ceiling and controlled by a sliding or hinged door. Outside walls and the ceiling of the barn should be insulated and where ducts occur, double boards with two-ply paper between should be used for warmth.

In cattle barns, the animals create enough warmth to keep the barn warm and to set up a proper circulation of air. In hog barns, it is necessary to use a heater in the winter months for best results.

In order that the Ventilating system may work, to its best advantage, it must be operated properly. Doors and windows of the barn should be kept closed as much as possible and the fresh air intakes opened wide, unless it is very cold and there are fewer animals than usual in the barn, or in the case of an extremely strong wind when the fresh air intakes should be closed down a little on the windward side. The foul air flues should be left wide open, except when a high wind causes too strong a pull, or when it is extremely cold.

